**Remarks/Arguments**

Applicants respectfully request favorable reconsideration of the subject application, particularly in view of the above amendment and the following remarks. There is no additional fee for this amendment as the number of independent claims remains unchanged and the total number of claims has been reduced.

Applicants have amended Claim 1 of the subject application by incorporating all of the limitations of Claim 7, as a result of which Claim 7 has been canceled. Claim 6 has been amended by deleting therefrom references to ceramic materials so as to avoid redundancy in the claims. Finally, Claim 10 has been amended to change the dependency from Claim 6 to Claim 1.

The invention claimed by Applicants is an apparatus comprising a carbonaceous material reactor vessel comprising at least one wall which encloses a reaction space. Disposed within the reaction space are a reaction zone containing a solid carbonaceous material and a product gas zone containing a reaction product gas. The at least one wall forms a carbonaceous material inlet, an hydrogen-rich gas outlet, and a retentate gas outlet. Disposed within the reaction space is at least one permeable hydrogen-selective membrane having a first side in contact with the reaction product gas and an opposite second side in contact with an hydrogen-rich gas.

The at least one permeable hydrogen-selective membrane comprises a ceramic material of perovskite oxide having a formula

$$A_{1-x}A'_xB_{1-y}B'_yO_{3-z}$$

where A is selected from the group consisting of Ba, Sr, Ca and Mg, A' is selected from the group consisting of La, Pr, Nd, Gd, and Yb, B and B' are selected from the group consisting of Ce, Nd, Sm, Eu, Gd, Tm, Yb and Y, O is oxygen, x and y are numbers in a range of 0 to 1, and z is a number sufficient to neutralize a charge in said perovskite oxide. Applicants respectfully urge that the prior art relied upon by the Examiner for rejection of the subject application neither teaches nor suggests an apparatus as claimed by Applicants comprising *a membrane selective for hydrogen permeation disposed inside the reaction space formed by the walls of a carbonaceous material reactor vessel having a reaction zone comprising a solid carbonaceous material wherein the membrane comprises the ceramic material of perovskite oxide claimed by Applicants.*

Claims 1, 6, and 8-13 have been rejected under 35 U.S.C. 102(b) as being anticipated by Weirich et al., U.S. Patent 4,713,234 (hereinafter "the Weirich et al. patent"). This rejection is respectfully traversed. The Weirich et al. patent teaches a process and apparatus for conversion of water vapor with coal or hydrocarbon into a product gas containing hydrogen using a hydrogen-permeable

membrane disposed within the reaction vessel for separation of the hydrogen from the product gas as it is produced. Applicants respectfully urge, however, that the Weirich et al. patent neither teaches nor suggests that the hydrogen-permeable membrane described therein comprises a ceramic material of perovskite oxide as claimed by Applicants. Accordingly, Applicants respectfully urge that the Weirich et al. patent does not anticipate the invention claimed by Applicants in the manner required by 35 U.S.C. 102(b).

Claims 3, 4 and 7 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Weirich et al. patent as applied to Claim 1 and further in view of Edlund, U.S. Patent 5,139,541 (hereinafter "the Edlund patent"). This rejection is respectfully traversed. Applicants arguments with respect to the Weirich et al. patent as set forth herein above are equally applicable to this rejection and, thus, will not be repeated here. The Edlund patent teaches a hydrogen-permeable composite metal membrane containing an intermetallic diffusion barrier, which is a thermally stable inorganic proton conductor, separating a hydrogen-permeable base metal and a hydrogen-permeable coating metal (Abstract). The Edlund patent describes the proton conductor in accordance with one embodiment as comprising doped $SrCeO_3$($SrCe_{1-x}M_xO_{3-\alpha}$ where x is from 0.05 to 0.10, $\alpha$ is a variable determined by the oxidation state of M and M is a metal selected from Dy, In, Mg, Nd, Sm, Y, Yb, and Zn. The base

metal is selected from Groups IIIB, IVB, VB, VIIB, and VIIIB of the periodic table and alloys thereof, and the coating metal is a hydrogen-permeable transition metal and alloys thereof. The Edlund patent is relied upon by the Examiner as teaching the use of a ceramic material with the claimed formula that is electron and proton conductive, as teaching a hydrogen-selective membrane that is utilized in hydrogen purification involving hydrogen production under elevated temperatures, and as teaching a membrane composition of palladium coated $SrCe_{1-x}Yb_xO_z$, based upon which the Examiner argues that it would have been obvious to one of ordinary skill in the art at the time of the invention to replace the palladium foil of the Weirich et al. patent with the membrane composition of the Edlund patent to reduce production costs of the apparatus while still maintaining acceptable hydrogen permeability. *Applicants respectfully urge that the Edlund patent does not teach or suggest a ceramic material having the claimed formula as asserted by the Examiner.*

As previously stated, the ceramic material of the invention claimed by Applicants has the formula

$$A_{1-x}A'_xB_{1-y}B'_yO_{3-z}$$

where A is selected from the group consisting of Ba, Sr, Ca and Mg, A' is selected from the group consisting of La, Pr, Nd, Gd, and Yb, B and B' are selected from the group consisting of Ce, Nd, Sm, Eu, Gd, Tm, Yb and Y, O is oxygen, x and y are

numbers in a range of 0 to 1, and z is a number sufficient to neutralize a charge in said perovskite oxide. Applicants respectfully urge that the only perovskite oxide material taught by the Edlund patent has the formula

$$SrCe_{1-x}Yb_xO_z$$

where x is from 0.05 to 0.10, $\alpha$ is a variable determined by the oxidation state of M and M is a metal selected from Dy, In, Mg, Nd, Sm, Y, Yb, and Zn and such perovskite oxide is not a perovskite oxide in accordance with the formula claimed by Applicants. Since x is from 0.05 to 0.10, the composition of the Edlund patent always includes the elements Sr and Ce. Applicants note that the only combination of elements under which Sr may be a component of the perovskite oxide claimed by Applicants in accordance with Applicants' claimed formula is one in which element A is present, i.e. x is less than 1, since none of the other elements of Applicants' claimed material can be Sr. And, if x is less than 1, and Sr is the first, A' of Applicants' claimed formula does not include Ce among the possible elements. Thus, a perovskite oxide comprising Sr and Ce as the first two elements is not in accordance with the formula claimed by Applicants. On the other hand, if x is equal to 1, then element A drops out of the formula leaving A' as the first element which, as claimed by Applicants, does not include the element Sr as one of the members of the group defining element A'. Accordingly, Applicants respectfully urge that the perovskite

oxide taught by the Edlund patent is not a material having the claimed formula and, thus, does not represent a teaching of a perovskite oxide having the formula claimed by Applicants. Applicants further respectfully urge that nowhere else does the Edlund patent teach or suggest the use of any other perovskite oxide materials, nor does the Edlund patent teach or suggest any perovskite oxide having the formula claimed by Applicants. Finally, Applicants respectfully urge that the Edlund patent neither teaches nor suggests a hydrogen separation membrane comprising a perovskite oxide having the claimed formula which is suitable for use in the environment of a coal gasification reactor vessel as claimed by Applicants. Accordingly, given that a perovskite oxide having the formula claimed by Applicants or the use of such a perovskite oxide in a solids gasification reactor as claimed by Applicants is neither taught nor suggested by the Weirich et al. patent or the Edlund patent, Applicants respectfully urge that the Weirich et al. patent and the Edlund patent, alone or in combination, do not render Applicants' claimed invention obvious in the manner required by 35 U.S.C. 103(a).

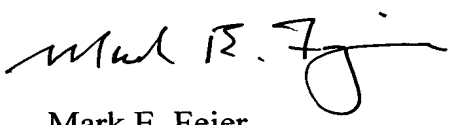
**Conclusion**

Applicants intend to be fully responsive to the outstanding Office Action. If the Examiner detects any issue which the Examiner believes Applicants

have not addressed in this response, Applicants urge the Examiner to contact the undersigned.

Applicants sincerely believe that this patent application is now in condition for allowance and, thus, respectfully request early allowance.

Respectfully submitted,



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